

CLAIMS

1. A phosphor element comprising:
a pair of electrodes opposed to each other; and
a phosphor layer sandwiched between the pair of electrodes and having silicon fine particles whose average particle diameter is not more than 100 nm,
wherein at least a part of a surface of the silicon fine particle is covered with a conductive material.
2. The phosphor element according to claim 1, wherein the conductive material comprises an oxide or a composite oxide containing at least one element selected from a group of indium, tin, zinc, and gallium.
3. The phosphor element according to claim 1, wherein the conductive material comprises a nitride or a composite nitride containing at least one element selected from a group of titanium, zirconium, hafnium, gallium, and aluminum.
4. The phosphor element according to claim 1 or 3, wherein the conductive material is titanium nitride whose thickness is not more than 30 nm.
5. The phosphor element according to claim 1, wherein the conductive material is magnesium silver alloy whose thickness is not more than 50 nm.
6. The phosphor element according to any one of claims 1 to 5, further comprising an electron transport layer between the phosphor layer and at least

one of the electrodes.

7. The phosphor element according to any one of claims 1 to 6, further comprising a thin film transistor connected to at least one of the electrodes.

8. A display device comprising:

a two-dimensional phosphor element array in which the phosphor elements are arranged, each phosphor element comprising:

a pair of electrodes opposed to each other;

a phosphor layer sandwiched between the pair of electrodes and having silicon fine particles whose average particle diameter is not more than 100 nm, wherein at least a part of a surface of the silicon fine particle is covered with a conductive material; and

a thin film transistor connected to at least one of the electrodes;

a plurality of x electrodes extending parallel to each other in a first direction which is parallel to a surface of the phosphor element array; and

a plurality of y electrodes extending parallel to each other in a second direction which is perpendicular to the surface of the phosphor element array, and

wherein the thin film transistor of the phosphor element array connects the x electrode to the y electrode.